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22 MAR 2005

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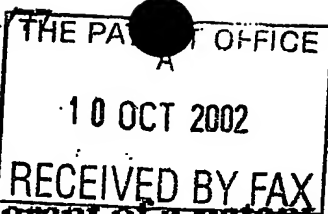
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Signed

Andrew Gersey

Dated

13 January 2004



The
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11OCT02 154839 C04074
P01/770 00-0223567.9

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

10 OCT 2002

The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference

BLADE

2. Patent application number

(The Patent Office will fill in this part)

0223567.9

3. Full name, address and postcode of the or of each applicant (underline all surnames)

WILLIAM ANTHONY DEBNE

THE LANE HOUSE
108 CHURCH STREET
GREAT SHELFORD

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

CAMBRIDGE CB2 5EL
3284502001

4. Title of the invention

CERAMIC RAZOR BLADE

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

AS IN 3 ABOVE

Patents ADP number (if you know it)

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

UK

0222712.2

01/04/02

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

N/A

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

NO

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description

Claim(s)

Abstract

Drawing(s)

0
2 /
0
1 /
0

CF

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

N
A

11.

I/we request the grant of a patent on the basis of this application.

Signature

W. Q. Dennis

Date 10 Oct 02

12. Name and daytime telephone number of person to contact in the United Kingdom

01223 846191

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Notes

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- Write your answers in capital letters using black ink or you may type them.
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CERAMIC RAZOR BLADES

Razor blades have traditionally been made from high quality carbon steel. The innovation of using stainless steel has been fraught with the difficulty of forming and holding an ultra sharp edge. Stabilised or partially stabilised zirconia blades are now well known. The material is as tough and strong as tool steel but has much greater
5 hardness. Ground ceramic razor blades tend to have a ragged microstructure rather than rounded and so dig into skin rather than sliding over it.

According to the present invention, there are razor blades that are fabricated from a ceramic ink that is screen printed on a combustible surface then fired. The ceramic is
10 preferably stabilised or partially stabilised zirconia. The combustible surface is preferably a plastic film of high surface finish. The ink vehicle and combustible surface may be so chosen that the ink wets the combustible surface.

Stabilised zirconia forms exceptional cutting blades. It is extremely strong, tough and
15 hard. In thin sheets it may be very pliable. It would appear to be an excellent medium for razor blade fabrication. The raw material is very expensive compared with steel and is expensive to diamond machine. Cutting edges in zirconia are conventional created by diamond machining, but this process produces ragged edges on a micro-scale which tend to dig into skin rather than slide over it. This, of course,
20 is disastrous in a razor blade.

Screen printing of ceramic inks is a well known mass production technique in hybrid electronics. This produces a thin film of very finely controlled thickness at very low cost. The ink comprises very finely powdered ceramic in a binder and solvent. It is
25 possible to choose the composition of ink such that it wets the substrate and the edges

CERAMIC RAZOR BLADES

of the print flow slightly to form a sharply pointed meniscus. On firing, the substrate may burn away and the meniscus will form a very sharp edge. The firing process causes the finely powdered grains to sinter into a solid mass. This process may be exploited to form an edge to the blade which is rounded on a microscale. With
5 modern milling techniques, the powder particle size may be some tens of nanometres. It is possible therefore to organise the firing to produce a blade with an edge radius of possible 50 nanometres or less.

The ceramic will take the surface finish of the substrate on the printed side, which
10 may approach optical quality for many plastic films. If this is the side that faces the skin, a very smooth blade will result. Screen printing produces very thin layers with excellent reproducibility. Zirconia blades as thin as 0.025 mm are likely to be feasible. By using thin blades of minimum width, blade costs of a fraction of a penny should be feasible.

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This fabrication technique offers the possibility of large scale mass coupled with low materials cost and no finishing processes.

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CERAMIC RAZOR BLADES

Abstract

- 5 Stabilised or partially stabilised zirconia may be screen printed onto a wettable plastic film then fired to produce low cost razor blades with an excellent edge.